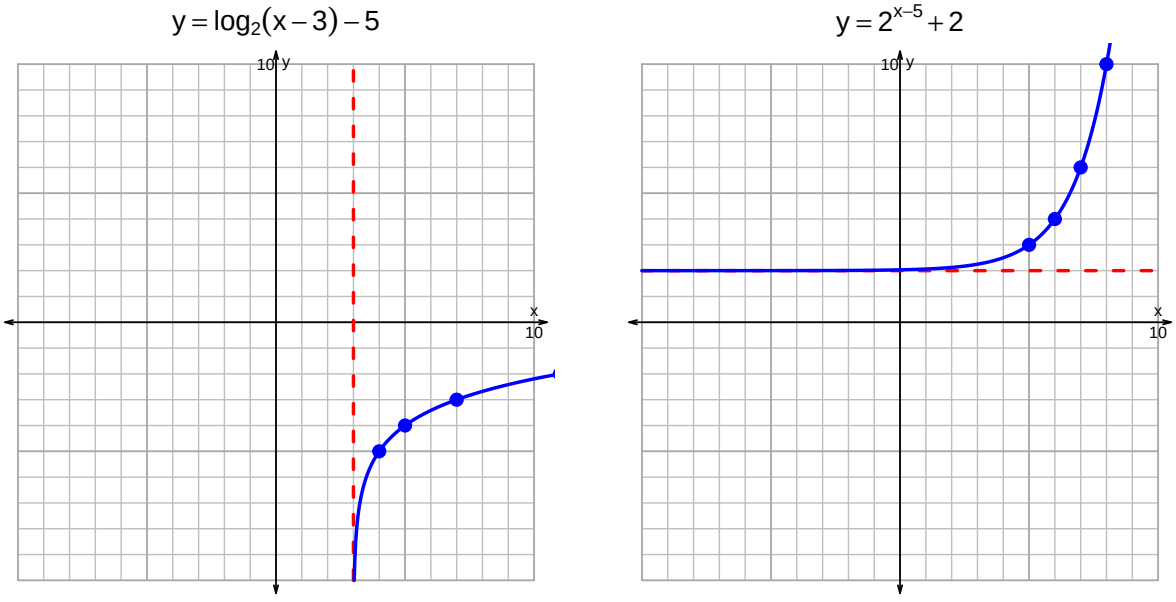
Name: Date:

s18: EXP LOG (SLTN v308)

1. (10 pts) Graph $y = \log_2(x-3) - 5$ and $y = 2^{x-5} + 2$ on the grids below. Also, draw any asymptotes with dashed lines.



Somewhat useful hint: $2^3 = 8$, *and thus* $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$-11 = \left(\frac{-4}{3}\right) \cdot 10^{-7t/5}$$

Divide both sides by $\frac{-4}{3}$.

$$\frac{11 \cdot 3}{4} = 10^{-7t/5}$$

Take log, base 10, of both sides.

$$\log_{10}\left(\frac{11 \cdot 3}{4}\right) = \frac{-7t}{5}$$

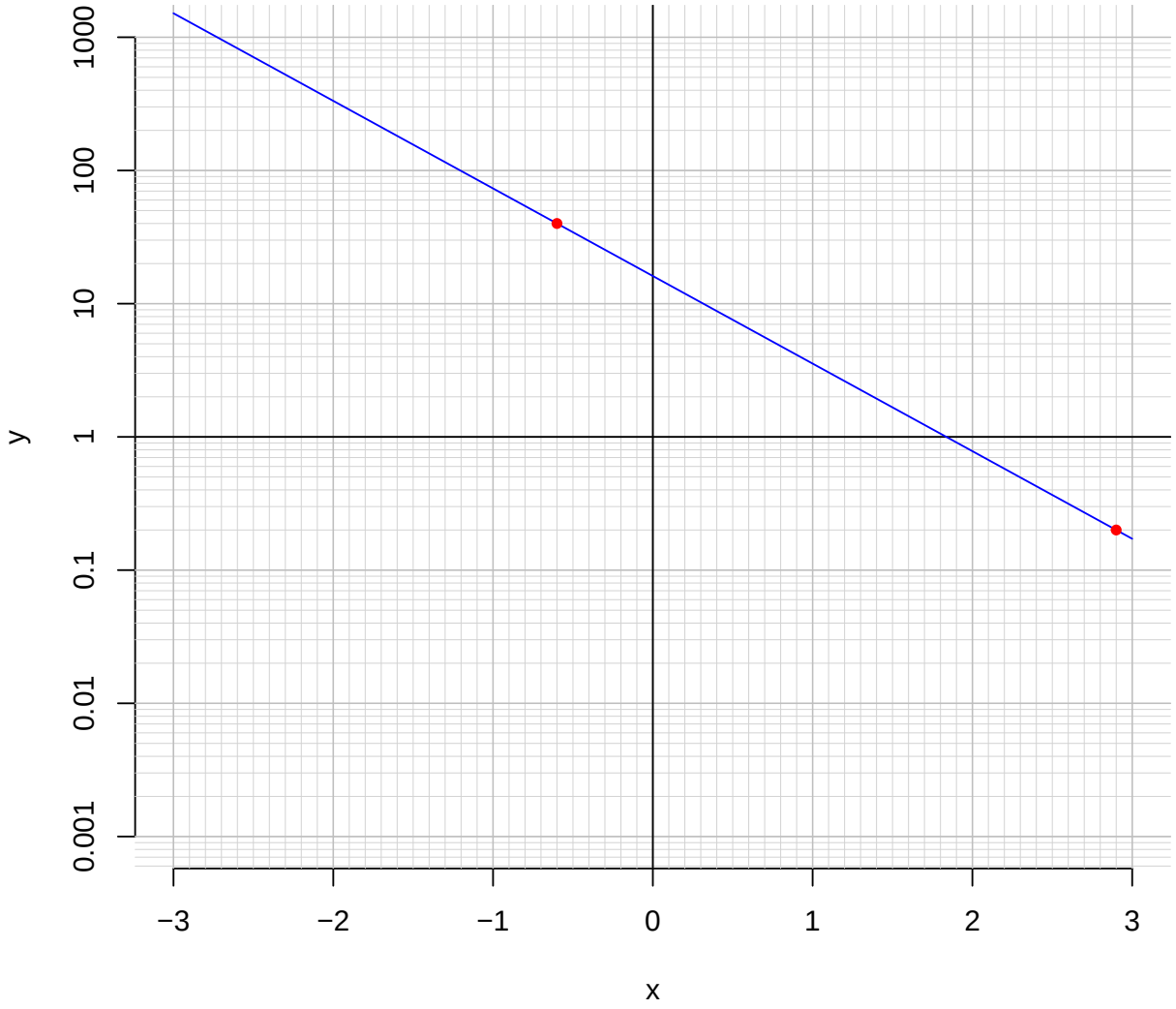
Divide both sides by $\frac{-7}{5}$.

$$\frac{-5}{7} \cdot \log_{10}\left(\frac{11 \cdot 3}{4}\right) = t$$

Switch sides.

$$t = \frac{-5}{7} \cdot \log_{10}\left(\frac{11 \cdot 3}{4}\right)$$

3. (10 pts) An exponential function $f(x) = 16.1 \cdot e^{-1.51x}$ is graphed below on a semi-log plot.



a. Using the plot above, evaluate $f(-0.6)$.

$$f(-0.6) = 40$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{-1}{1.51} \cdot \ln\left(\frac{x}{16.1}\right)$$

Using the plot above, evaluate $f^{-1}(0.2)$.

$$f^{-1}(0.2) = 2.9$$